R E P O R T R E S U M E S

ED 017 016 CG 001 690

COMPUTER ASSISTED COUNSELING. PROGRESS REPORT NO. 1.

BY- ROBERTS, TOMMY L. FREDERICK, FRANZ J.
OKLAHOMA STATE UNIV., STILLWATER, RES. FOUNDATION

PUB DATE 67

EDRS PRICE MF-$0.25 HC-$1.00 23P.

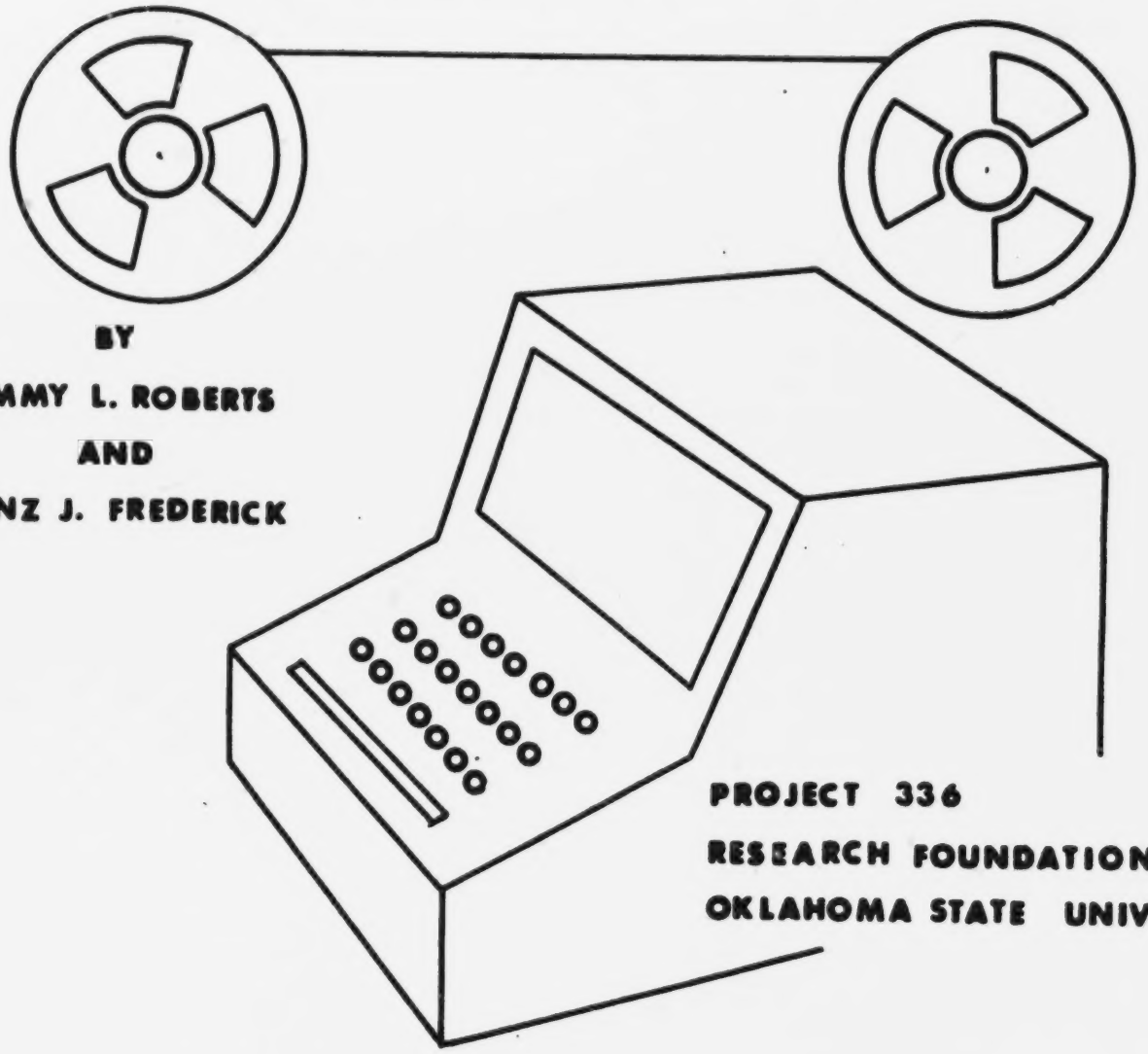
DESCRIPTORS- COUNSELING THEORIES, *COUNSELING PROGRAMS, COMPUTERS, *COMPUTER ORIENTED PROGRAMS, *DECISION MAKING, TAXONOMY, INFORMATION SYSTEMS, *RESEARCH PROPOSALS,

PRESENT HUMAN COUNSELING SYSTEMS DO NOT PROVIDE ADEQUATE ACCESS TO VARIOUS DATA REQUIRED FOR THE FORMULATION OF "INTELLIGENT" DECISIONS ON THE PART OF THE STUDENT. A TAXONOMY OF DECISION SITUATIONS SHOWS THAT NINE OF THE 12 DECISION MODES REQUIRE THE USE OF A RAPID ACCESS INFORMATION RETRIEVAL SYSTEM OR COMPUTER. AT LEAST FIVE OF THE DECISION MODES ALSO REQUIRE INTERACTION BETWEEN THE COMPUTER AND THE STUDENT. SUCH INTERACTIVE DECISION MODES ARE NOT BEING EXTENSIVELY STUDIED IN CURRENTLY OPERATING PROJECTS. OKLAHOMA STATE UNIVERSITY'S PROJECT, PLANNED FOR 1967-68, WILL HAVE THE CAPABILITY OF INVESTIGATING ANY OF THE NINE DECISION MODES USING A CLUSTER OF 10 STUDENT DECISIONS. THE PROJECT'S THEORETICAL CONCERNS AND LEVELS OF SYSTEM DEVELOPMENT ARE PRESENTED SCHEMATICALLY. ACTUAL DEVELOPMENT, TRIAL, AND IMPLEMENTATION OF THE SYSTEM ARE CONSIDERED PHASES WHICH REQUIRE OUTSIDE FUNDING AND PUBLIC SCHOOL PARTICIPATION. THE PROPOSAL, AS OUTLINED, HAS BEEN SUBMITTED TO THE U.S. OFFICE OF EDUCATION FOR CONSIDERATION UNDER TITLE III OF THE ELEMENTARY AND SECONDARY EDUCATION ACT. (NS)

Session 10.8
AERA

ED017016

COMPUTER ASSISTED COUNSELING



BY

TOMMY L. ROBERTS

AND

FRANZ J. FREDERICK

PROJECT 336

RESEARCH FOUNDATION

OKLAHOMA STATE UNIVERSITY

CG 001 690

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

OKLAHOMA STATE UNIVERSITY RESEARCH FOUNDATION
COLLEGE OF EDUCATION
COMPUTER ASSISTED COUNSELING
PROGRESS REPORT NO. 1
FEBRUARY 1, 1967 TO AUGUST 31, 1967

Introduction

One of the most urgent needs of all students (grade 7 through second year in college) is that of meaningful assistance in making "intelligent" decisions relevant to academic, vocational and personal development. "Intelligent" decisions, tend to optimize the chances for success in the student's pre- and post-school experiences and help increase the probability of his becoming a useful and productive member of society.

There is reason to expect that this need of students for meaningful assistance will continue to increase. Basic to this premise is the extension of knowledge, curricular expansion, and the ever increasing complexity of society with its corollary of expanding alternatives and explosive characteristics.

Problem

Present human counseling systems do not provide for adequate access of various data required for the formulation of "intelligent" decisions on the part of the student. This problem is complicated by (1) quantity and quality of data available through public school counselors, (2) limited student access time to counselor, (3) lack of adequate conceptualization concerning the kinds of decisions facing students, (4) lack of adequate conceptualization of counselor role relevant to the student

decision making process, and (5) lack of qualified counseling personnel to adequately help all students in the decision making process.

It would appear that modern computer technology with direct accessing could offer relief with respect to the general problem of storing and accessing the rather prodigious quantity and types of data required in making "intelligent" social decisions. The appropriate application of such technology would depend of course upon the development of a general theoretical framework which takes into account the previously enumerated complications.

The taxonomy of decisions affecting students as shown in Figure 1 was postulated by the authors in an attempt to deal with the problem and its various complications. The taxonomy is a two-way classification table with decision control and operating system for accessing information as its major dimensions. It may be noted that the taxonomy constitutes a three by four classification table which in turn generates twelve decision situations, each defined by some particular mode of decision control and operating information retrieval system. Nine of these twelve decision modes require the use of a sophisticated rapid access information retrieval device or system.

It is obvious that at the present developmental level of technology, modern computer systems are the answer to the problems of rapid accessing of large bodies of data. A concomittant problem concerned with large bodies of data is the problem of rapid analysis of these data.

The present generation of computer devices permits on-line control of the processes of rapid data retrieval and analysis. Such on-line

Figure I

TAXONOMY OF DECISIONS AFFECTING STUDENTS

Student Alone	Student-Counselor	Counselor-Student	Operating System
Problem Solution (No Outside Control)	Personal Problem Solving Where Student Utilizes Counselor Function As A Reference Device	Counselor "Control" in Helping Student "Fix" on Appropriate Problem Solution	Non-Computer
"Student Interactive" Student Controls the Inquiry or Information Gathering Process	"Student Interactive" With Counselor Provided Information (Counselor Provides Information and May be Modificatory)	"Counselor Interactive" Counselor Controlled Problem Examination and Solution	Computer as a Search Tool
Student Solves Problem on Basis of Information Provided by Computer Querying Student and Then Filling in Gaps	Computer Queries Both Student and Counselor and Returns Information to Student	Computer Queries Student and Counselor and Returns Information to Counselor	Computer Inquiry
"Student-Computer Interactive" where Both Query and Student Essentially Formulates Decisions Without Assistance	Student and Counselor Interact with Computer so That Computer Queries as Well with Student Retained Ultimate Decision Choice	Counselor and Student Interact with Computer (Computer also Queries and Student still Makes the Decision with Assistance	Human-Computer Interaction

operation allows an individual to effectively control the computer in order to acquire relatively rapid retrieval and processing of information.

An examination of the nine decision modes which require a computer base all may be on-line functional, however, it should be noted that only four of the nine decision modes may be fruitfully implemented in a non-on-line application. (See Figure 2).

Three of the decision modes involve human information retrieval. These three decision modes also represent three major schools of counseling and guidance theory. These various theoretical orientations may be observed in action in various public school systems in Oklahoma and other parts of the nation.

An examination of the literature reveals that only three of the nine modes have been examined and that each of these projects has been limited to a consideration of one or two basic decisions that the student may encounter. (See Figure 3).

As is often the case, the literature includes only tantilizing fragments concerning the actual conceptualization and operation of these projects. Therefore, funds were secured from the Oklahoma State University Research Foundation in order that these projects might be examined first-hand. On the basis of the literature and first-hand evaluation, projects presently operating appear to fit in the taxonomy as shown in Figure 3.

Only one project has so far been concerned with the decision mode which may be titled interactive. This project was carried out by System Development Corporation and was basically concerned with one student decision (selection of academic course schedule) and a

Figure 2

A Three Dimensional Representation of The Taxonomy of Decisions Affecting Students Showing Those Areas Feasible for Off-line and On-line Operations

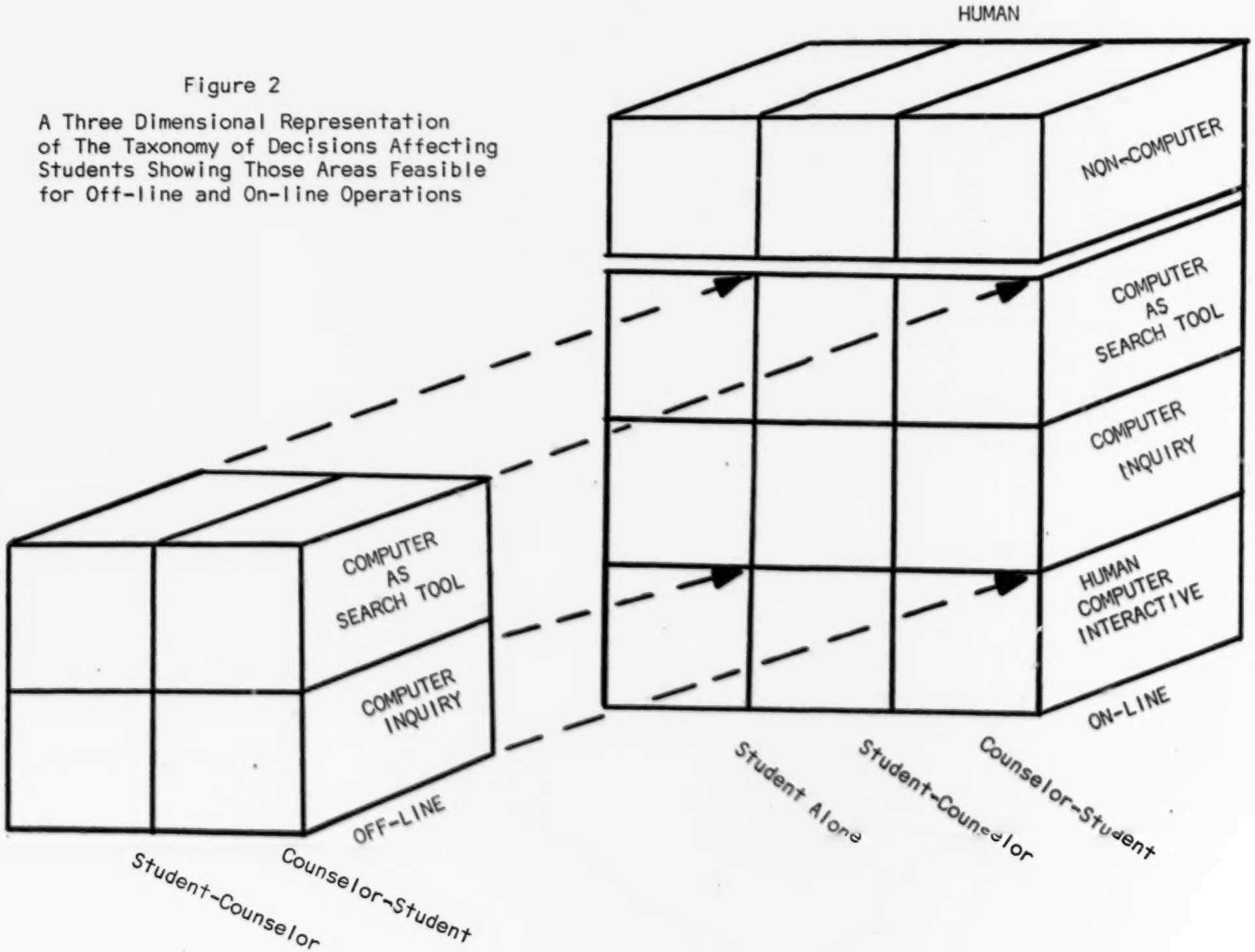


Figure III

TAXONOMY (OUTLINE) SHOWING TYPES OF FUNDED PROJECTS IN OPERATION (AND LOCATION)

Student Alone	Student-Counselor	Counselor-Student	Operating System
Not Formally Used In Public School Situations	← These Are Relatively Common And Dependent On The Philosophy of Local School	Las Vegas (Clark County) "Profile Counseling"	Non-Computer →
Harvard (Tiedeman) (Vocational Decisions)		System Development Corp.	Computer as a Search Tool
Palo Alto Unified School District (Murray Tondow) System Development Corp. (Estavan - Cogswell)			Computer Inquiry
			Human-Computer Interaction

computerized sequence for the analysis of cumulative record data. The general theoretical framework within which this project has been couched is the counselor interactive approach.

It may be noted through careful analysis that the description of each computer assisted decision mode as shown in Figure 1 may be used to generate an outline of the performances and capabilities required of a computer system in each particular decision mode. These performances are outlined in a taxonomy (See Figure 4) of performances and capabilities required through the two major dimensions considered in the taxonomy in Figure 1. It may be observed through careful analysis of the counselor interactive decision mode that the computer may be used in either an on-line or batch processing mode.

Figure 5 indicates the present capability of Oklahoma State University for a project demonstration in 1967-68. Figure 6 is based upon Oklahoma State University's acquisition of an IBM System/360 Model 50 Computer System. As may be noted from Figure 6, after the installation of the Model 50, O.S.U. will possess the capability of investigation into any of the nine computer assisted decision modes.

The main concern of this project has not been with the treatment of a single student decision, but rather a cluster of some ten student decisions. These decisions which are shown in Figure 7 may be dichotomized - i.e. (a) present imperative decisions and (b) future imperative decisions. Figure 7 illustrates not only these decisions, but also a preliminary consideration of a data base and the kinds of data required from the data base for the decisions. The representation in Figure 7 may be represented in a flow-chart which represents three

Figure IV

TAXONOMY (OUTLINE) SHOWING OUTLINE OF PERFORMANCES/CAPABILITIES REQUIRED OF COMPUTER DEVICES (BY AREA)

Student Alone	Student-Counselor	Counselor-Student	Operating System
NO PERFORMANCES REQUIRED BY COMPUTER	Student Does Not Receive Information Before The Counselor (For 6 Below)		Non-Computer
Large Relatively Accessible Data Bank (No More Than 15 Sec. Delay) Student Online Access Multiple Student Online Operation Hard Copy Output	Large Data Base A. No Time Limit-Not Online B. Time Limit 15 Sec. (Online) Easy Data Input Counselor Online-Soft and Hard Copy-Visuals Desired	Large Data Base A. No Time Limit-Not Online B. Time Limit 15 Sec.(Online) Easy Data Input Counselor Online-Soft and Hard Copy-Visuals Desired	Computer as a Search Tool
ABOVE PLUS Pre-Programmed Question Clarification Loops Activated By Specific Flags	DITTO PLUS A. Student Online B. Counselor Online C. Student and/or Counselor Online Soft and/or Hard Copy Visuals Capability	DITTO Except Student Gets Formal Information in Counseling Interview	Computer Inquiry
ABOVE PLUS Routine Which Analyzes Students Data and Performs Various Matchings These Matching, Student Questions and Responses Determine Which Loops Are Activated	THESE COMBINED	DITTO Except Student Gets Information in Formal Counseling Interview	Human-Computer Interaction

These May or May Not Be Online

Figure V

PRESENT CAPABILITY OF OKLAHOMA STATE UNIVERSITY
IN PROJECT DEMONSTRATION (1967-68)

Student Alone	Student-Counselor	Counselor-Student	Operating System
← NO PERFORMANCE REQUIRED BY COMPUTER →			Non-Computer
Not Possible No Online Capability	Student Receives Information at Same Time as Counselor Only Batch Processing With Hard Copy Output - No Visuals (Projected or Prt) Programmed Search System	Student Receives Information After Counselor In Formal Counseling Interv. ← SAME (Each Session Can Be Devoted Only to One Search)	Computer as a Search Tool
Not Possible (Requires Online)	↑ ABOVE PLUS Requires Extensive Programmed Analysis Loops (Limited by Memory Size)	Offline Application Requires Several Interview Sessions to Use Computer Information and Respond To ← SAME PLUS Clarification Requests etc	Computer Inquiry
Not Possible (Requires Online)	Not Possible (Requires Online)	Not Possible (Requires Online)	Human-Computer Interaction

Figure VI

OKLAHOMA STATE UNIVERSITY CAPABILITY

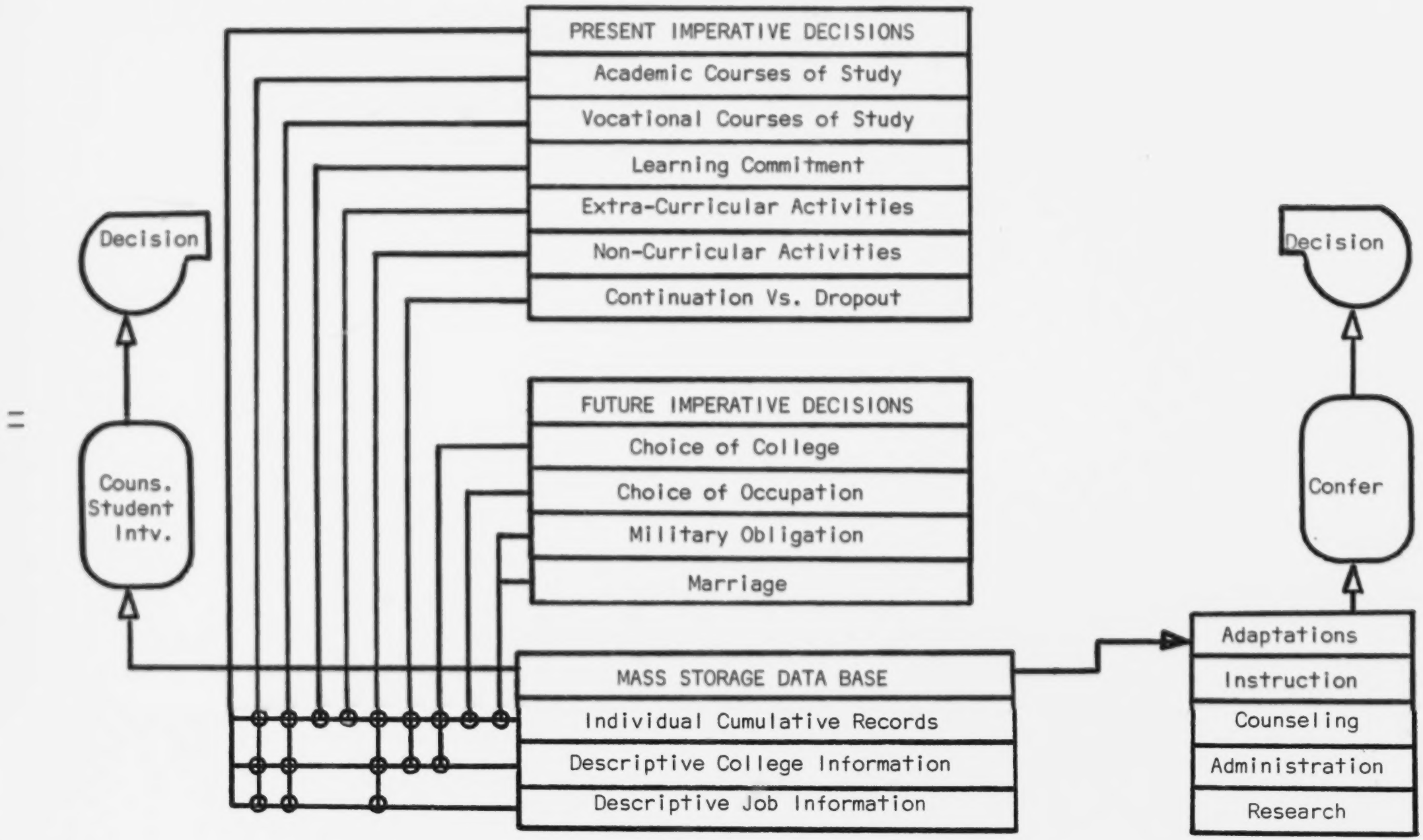
1969 (IBM MOD. 50)

Student Alone	Student-Counselor	Counselor-Student	Operating System
NO PERFORMANCE REQUIRED BY COMPUTER			Non-Computer
ALL COMPUTER OPERATIONS POSSIBLE BUT GENERALLY LIMITED BY THE TYPE OF MEMORY, SIZE OF MEMORY, AND INPUT-OUTPUT DEVICES			Computer as a Search Tool
			Computer Inquiry
			Human-Computer Interaction

Figure VII

(Example III.)
(Proposal)

A COGNITIVE SELF DISCOVERY-ACTUALIZATION SYSTEM



main system behaviors, (1) input, (2) internal operation, and (3) output. (See Figure 8).

Figure 8 represents schematically and concisely this project's theoretical concerns and relationships occurring in a counselor interactive computer assisted counseling and guidance system. Each of the decision packages represented must be carefully analyzed, flow-charted, programmed and debugged before first implementation can occur. The process described can easily be visualized as in Figure 9.

Important levels of the Functional Model of Research and Computer Assisted Counseling System Development (Figure 9) may be outlined as follows:

Simulation

Once a design is approved by all interested factions, it will be tested by simulation through the joint efforts of the project Research and Systems Development and Operations Divisions. Should the design prove undesirable in terms of results, it will be returned to the design stage for additional analysis and redesign. This looping procedure will be continued until simulation criteria are met. When the design meets simulation criteria it will be passed on to the field trial stage.

Field Trial Stage

The Field Trial Stage will represent a control on performance and conditions expected in actual practice. If field criteria are not met, the task will be returned to the design stage. Should field criteria be met, a Decision Package appraisal for the completed part of the system will be made. Following completion of a successful appraisal the design will then be implemented under actual conditions on a monitored basis.

Monitored Implementation

The Research and Systems Development Division will maintain a monitoring role with a specific design until general implementation is made. Following general implementation, the Research and Systems Development Division will make an orderly phase-out of its developmental responsibility, and transfer control to the Operations Division and the Public Schools. However, continued assistance is assumed for the operational responsibility and the continuation of the Decision Package or its integration with other existing Decision Packages into a Decision Package System.

Figure VIII

(Example IV.)
(Proposal)

COUNSELOR-COMPUTER INTERACTIVE SYSTEM

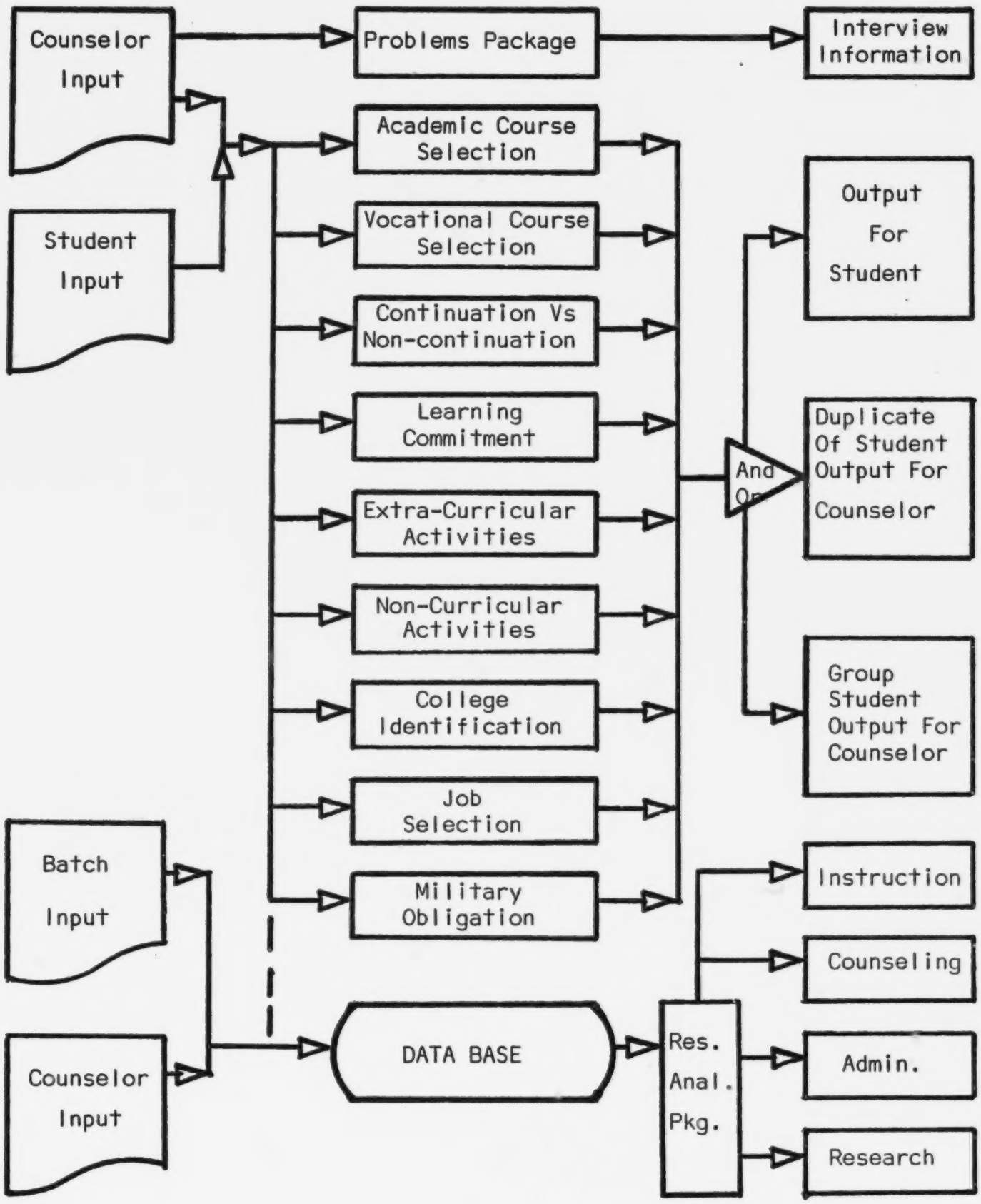
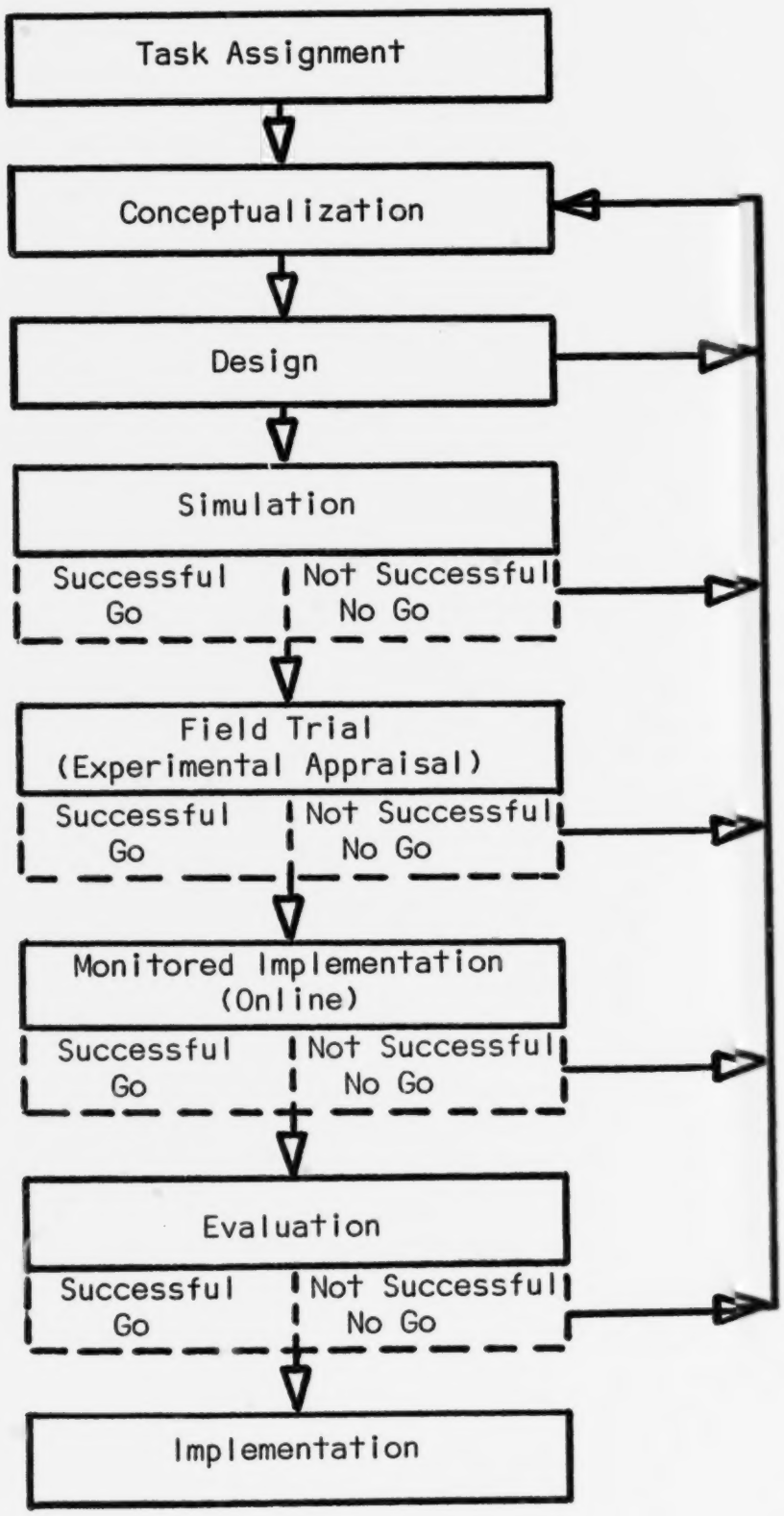


Figure IX

(Example V.)
(Proposal)

FUNCTIONAL MODEL OF RESEARCH AND COMPUTER ASSISTED

COUNSELING SYSTEMS DEVELOPMENT



Evaluation

The evaluation stage will hopefully determine the degree to which design performance meets the original objectives. If evaluation indicates that design performance is not within an acceptable range, the task force shall recommend the appropriate development stage, i.e., design, simulation, field trial, or monitored implementation. Should the evaluation indicate the design is successful within an acceptable performance range, the decision package can then be implemented.

Implementation

Following the decision for implementation, the Research and Systems Development Division will have completed the task except for informal contact with Operations. Should additional problems arise that Operations and the Public Schools cannot resolve, it is assumed that consultant services will be abailable from the Research and System Development Division.

Consideration of the general theoretical framework proposed herein, and the taxonomy of computer capabilities and performances indicate that a project in counselor interactive computer assisted guidance and counseling is indeed feasible. Examination of Figures 2 and 5 indicate that progress in such a project can be initiated modestly through the use of batch processing equipment, but that a full scale project would require an on-line, high speed, rapid access memory computer system. Such a full reach investigation can be broken down into four phases. These four phases are schematicized in Figure 10. It may be noted that this project essentially comprises Phase I. Phase II, III, and IV require outside funding and the magnitude in scope of such a full scale investigation would require a multi-funding base.

In as much as a full scale investigation of the type proposed in this project would require the cooperation of various state and public school agencies, some plan for delegation and sharing of responsibility is desired. Such a plan is illustrated in Figure 11.

Figure 10

COMPUTER ASSISTED COUNSELING SYSTEMS

PROJECTED DEVELOPMENT SCHEDULE

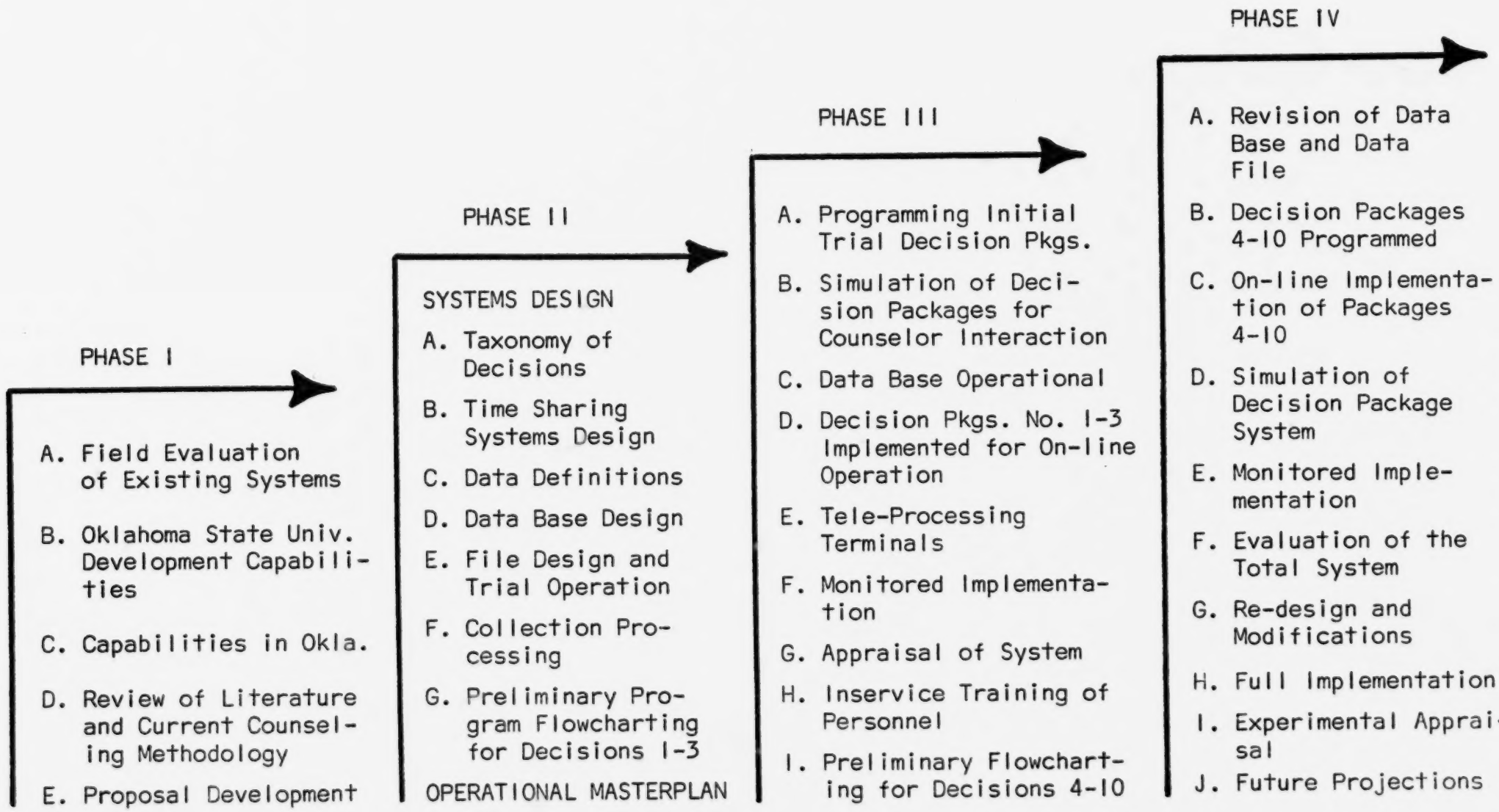
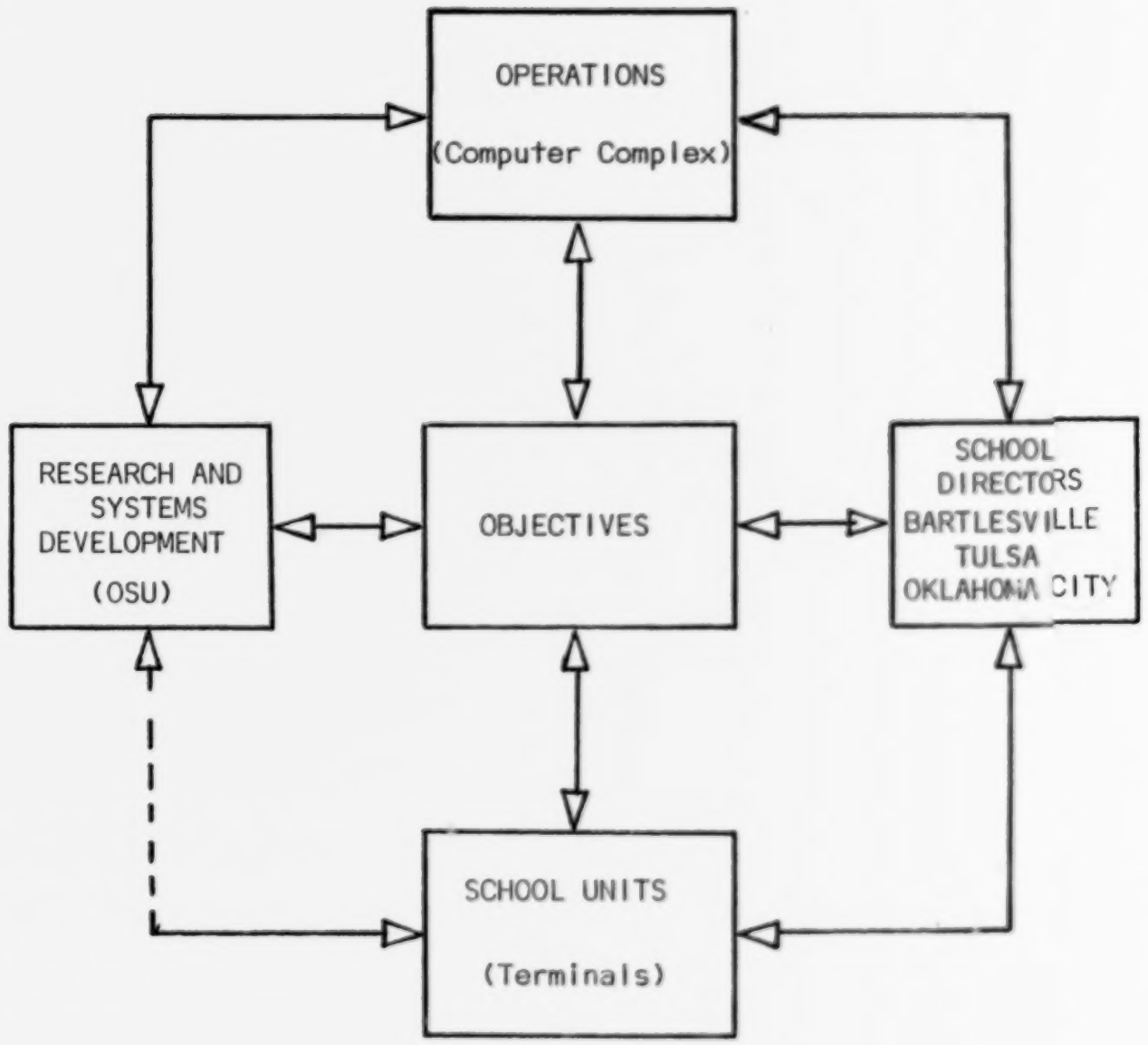

PHASE I
A. Field Evaluation of Existing Systems
B. Oklahoma State Univ. Development Capabilities
C. Capabilities in Okla.
D. Review of Literature and Current Counseling Methodology
E. Proposal Development
PHASE II
SYSTEMS DESIGN
A. Taxonomy of Decisions
B. Time Sharing Systems Design
C. Data Definitions
D. Data Base Design
E. File Design and Trial Operation
F. Collection Processing
G. Preliminary Program Flowcharting for Decisions 1-3
OPERATIONAL MASTERPLAN
PHASE III
A. Programming Initial Trial Decision Pkgs.
B. Simulation of Decision Packages for Counselor Interaction
C. Data Base Operational
D. Decision Pkgs. No. 1-3 Implemented for On-line Operation
E. Tele-Processing Terminals
F. Monitored Implementation
G. Appraisal of System
H. Inservice Training of Personnel
I. Preliminary Flowcharting for Decisions 4-10
PHASE IV
A. Revision of Data Base and Data File
B. Decision Packages 4-10 Programmed
C. On-line Implementation of Packages 4-10
D. Simulation of Decision Package System
E. Monitored Implementation
F. Evaluation of the Total System
G. Re-design and Modifications
H. Full Implementation
I. Experimental Appraisal
J. Future Projections

Figure XI

RESEARCH AND COMPUTER SYSTEMS DEVELOPMENT

TASK FORCE CONCEPT FOR COUNSELING

PROPOSED FOR 1967-71



(Example 1.)
(Proposal)

As the public schools may desire to participate in this full scale investigation and move into practical application of the results it was felt that initial planning funds should be sought through Title III of the Elementary and Secondary Education Act.

Figure 12 shows the computer capabilities of various public school systems within the state. It may be noted that Bartlesville, Oklahoma, has limited computer facilities within the school system, however, there exists potential access to industrial computers in that location. While it may be noted from Figure 13 that Bartlesville is not a geographically central school district, it was still felt after careful consideration, that the Bartlesville School District would be most likely to receive serious Title III funding consideration for a project of this magnitude. A Title III proposal was completed in cooperation with the Bartlesville School District, Tulsa, and Oklahoma City.

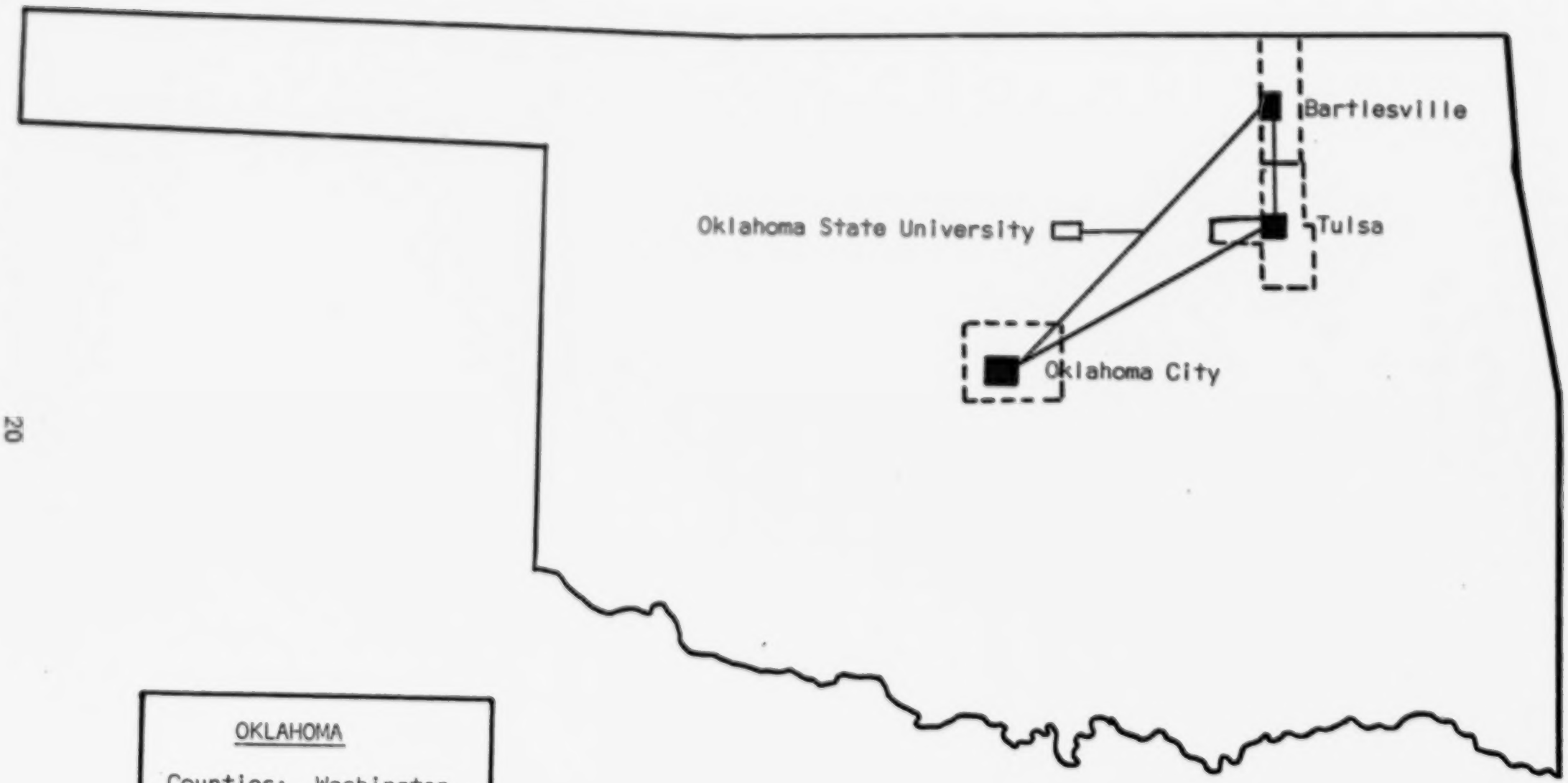
This proposal was approved and submitted to the U. S. Office of Education on July 1, 1967. Following consultation and approval of the State Department of Education, it now awaits U.S.O.E. approval.

Figure XII

PRESENT CAPABILITY IN STATE
(BY LOCATION)

Student Alone	Student-Counselor	Counselor-Student	Operating System
← NO PERFORMANCES REQUIRED BY COMPUTER →			Non-Computer
NONE	OFF-LINE: OSU (IBM) Bartlesville (IBM) Oklahoma City (IBM) Tulsa (IBM,CDC) Oklahoma Univ. (IBM) State Dept. Of Ed. (RCA)	OFF-LINE: ← DITTO	Computer as a Search Tool
NONE	DITTO ↑	← DITTO	Computer Inquiry
NONE	NONE	NONE	Human-Computer Interaction

Figure XIII



OKLAHOMA

Counties: Washington
Tulsa
Oklahoma